PROJECT FACT SHEET

CONTRACT TITLE: Development of a Multi-Station Borehole Seismic Receiver. OIL RECOVERY TECHNOLOGY PARTNERSHIP.
DATE REVISED: December 26, 1989

OBJECTIVE: The development of a receiver technology based on the capabilities needed to implement cross well surveys in a commercial environment.

CONTRACT NO: FEW 2333
CONTRACT AMT:
B AND R CODE: AC0530000

CONTRACTOR:
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CONTRACT PERFORMANCE PERIOD:
06-22-89 TO 09-30-90
PROJECT BEGINNING: 06/89

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Albuquerque, NM 87815

SCHEDULE MILESTONES:

PHASE I. Selection of a commercial research partner.....06/89-09/89
Detailed proposal for industry cost share.....10/89
Sensor evaluation.....06/89-09/89
Sensor Development.....10/89-05/90
Data communication system evaluation.....08/89-02/90
Mechanical system design evaluation.....11/89-06/90
Sensor package laboratory testing.....06/90-08/90
Mechanical system prototype construction laboratory testing.06/90-10/90
Data communication electronics demonstration.....03/90-07/90

CONTR.	FUNDING (1,000's)	DOE	OTHER	CONTR.	TOTAL
	PRIOR FISCAL YRS.	255	0	0	255
	FISCAL YR 1990	450	0	0	450
	FUTURE FUNDS				
	TOTAL EST'D FUNDS	705	0	0	705

PROJECT DESCRIPTION:

The receiver development will incorporate the following key technical capabilities. Multi-station: The design will accommodate the possibility of greater than 10 and preferably on the order of 30 multi-component stations. Advanced Sensor Technology: The design incorporates sensors that have both high sensitivity and broad frequency response. Both geophones and solid state accelerometers will be examined as candidate sensors. Data Communications: The technology will target the capability for near real-time transmission of 4000 Hz band_width data per sensor. Temperature hard: The receiver should be able to withstand extended exposure to 200 degrees C and brief exposure to 250 degrees C. This major hardware development (through ORTP) will be done in close working relationship with industry. A key element of the initial work will be the identification of an industrial research partner who will be responsible for portions of the technical development and it is expected will be the eventual vehicle for making the tool developments commercially available. Successful completion of the research/development effort will greatly enhance use of crosswell seismology as a reservoir imaging tool. This will contribute to improved use of domestic oil reserves through improvements to seismic exploration, enhanced recovery flood mapping and description of producing fields.

PRESENT STATUS:

Currently putting together a call for proposals to establish a commercial industrial partner through a competitive effort.

ACCOMPLISHMENTS:

Since June 1989, primary technical focus has been to evaluate sensor technologies: commercial geophones, in-house & commercial accelerometers, and fiber optic technologies appropriate for the multi-station receiver. Fiber optics accelerometry offers an attractive technology; considerable development is needed before specifications and fielding requirements can be designed. A commercial piezoelectric accelerometer that nearly meets design specifications has been identified and an RFQ has been issued to upgrade to specifications. Typical receiver dimensions, weights and materials were utilized in initial calculations examining frequency & mode shape response of a typical downhole receiver. Tool response was analyzed using a NASTRAN beam model. Calculations show the first bending mode of the tool at 215 Hz with numerous additional modes between 250 and 500 Hz. These calculations demonstrate the problems that occur if current tool design are used in attempts to gather high frequency data. The response analysis capabilities will be utilized throughout receiver development to insure the design has appropriate characteristics for high frequency recording. October 1989 and RFQ was issued with final bids due in November 30, 1989. It is anticipated negotiations with the potential partner should be completed so Phase I of the initiative will begin in January 1990.

BACKGROUND:

The application of crosswell seismic surveys to imaging reservoirs and recovery processes requires a large collection of seismic data. The requirement that data be collected in a wellbore, being used for exploration or production, implies that seismic data collection be fast & the instrumentation very reliable. Current downhole receiver technology developed for vertical seismic profiling does not place the same requirements on the tool as does crosswell work, thus this proposal.